SALMON AND STEELHEAD HABITAT LIMITING FACTORS IN WRIA 1, THE NOOKSACK BASIN

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EXECUTIVE SUMMARY

Introduction

In the last few decades, many salmonid populations in Washington State have declined, leading to the inclusion of bull trout and Puget Sound chinook salmon on the Endangered Species List. In response, the Washington State Legislature passed several bills to address the problem in a logical, concerted manner. Two key pieces of legislation (Engrossed Substitute House Bill 2496 and Second Engrossed Second Substitute Senate Bill 5596, now 77RCW) initiated the process towards the development of "Habitat Limiting Factors" reports.

This report is the habitat limiting factors project for WRIA 1, the Nooksack Basin. It provides a consolidation of existing habitat information in a Statewide consistent format, and rates various categories of habitat conditions. The habitat categories include fish habitat access, floodplain, sediment, streambed, riparian, water quality, flow, estuarine and nearshore conditions. Each of those conditions are rated as either "poor", "fair", "good", or "data gap", based upon a set of standards that are described in the Assessment Chapter. This Executive Summary presents only an overview of the worst habitat problems, but all the habitat ratings are provided in Tables 15 and 16 in the Assessment Chapter. More importantly, detailed discussions for each of these habitat conditions can be found within the Habitat Limiting Factors Chapter of this report. Maps of updated salmon and steelhead trout distribution and nearshore conditions are located in a separate electronic file on this disc.

The streams addressed in this report include all salmon- and steelhead-producing streams in the following basins: the Nooksack, Dakota, California, Terrell, Squalicum, Whatcom, Lake Whatcom, Padden, Chuckanut, Oyster, Colony, Sumas, Saar, Frost, Selesia, Domfino, Tomyhoi, and the Chilliwack Basins. The Fraser River tributaries include only those portions found in Washington State.

Major Habitat Problems in the Nooksack Basin

Of all the drainages in WRIA 1, the Nooksack is the largest and produces the greatest abundance of salmonids and the greatest number of salmonid stocks. As many as 19 different salmon, steelhead, bull trout, and cutthroat trout stocks are currently identified within the Nooksack Basin, including 4 possible stocks of chinook, 2 native chum stocks, coho, 3 pink stocks, 1 riverine sockeye stock, 4 steelhead stocks, 1 cutthroat stock, and 3 Dolly Varden/bull trout stocks.

Most of the salmonid spawning habitat in the Nooksack Basin is located in the three forks of the Nooksack River. However, much of this area has considerable sedimentation problems, most originating from landslides. In the South Fork Nooksack sub-basin, more than 1200 landslides have been identified with 37% associated with clearcuts and 32% related to roads. Road densities are generally high, especially in the Hutchinson, Skookum, Edfro, Cavanaugh, Deer, Roaring,

Plumbago, and Howard Creek watersheds and along the middle reaches of the South Fork Nooksack River. The suspended sediment levels in the mainstem South Fork are sometimes higher than in the glacially fed Middle Fork Nooksack River. Sediment transport is further impaired by a lack of large woody debris (LWD), and the excess sedimentation has likely contributed to a lack of adequate pool habitat. In the past, streambed instability and poor gravel quality have been documented in the South Fork Nooksack River, but current conditions are unknown for these parameters.

The North and Middle Fork Nooksack Rivers have a naturally high sediment load due to glacial inputs. However, human-caused sedimentation is considerable. About 480 landslides have been recorded in the Middle Fork Nooksack River sub-basin with 36% linked to roads and 32% associated with clearcuts. Road densities are generally high; as much as 12.6 miles of road per square mile of watershed in Heislers Creek. Most roads are unpaved, which worsens the sedimentation impact. Very little data were found regarding gravel quality, LWD, pool habitat, streambed and channel stability conditions in the Middle Fork Basin.

An estimated 632 landslides have been documented in the North Fork Nooksack sub-basin. Roads have been associated with 36% and clearcuts with 28% of the landslides. Most landslides occurred within 10 years of intense timber harvest in a given area, and the landslide frequency correlates well to forest practice activity both temporally and spatially. Landslide densities are especially high in the Cornell, Racehorse, Gallop, Boulder, and Coal Creek watersheds with generally high road densities in most of the watersheds downstream of Nooksack Falls. Data were limited for substrate quality, LWD, pools, channel and streambed stability, but where data were available, channel and streambed instability and low levels of LWD were common.

Other habitat problems in the Forks include impacts to riparian, floodplain, water quality and flow conditions, and most of these problems occur in the lower reaches. The lower South Fork Nooksack River has dikes along 60% of its length, and its channel length has decreased by an estimated 37%, likely due to a loss of secondary channels. Riparian conditions are rated "poor" in this same area, as well as in some of the tributaries, such as Black Slough and Hutchinson Creek. Warm water temperatures are a critical problem in the South Fork Nooksack sub-basin with 52% of the samples warmer than 20^{o}C and a peak temperature of 23.9^{o}C in the lower South Fork Nooksack River in 1996. Warm water temperatures have also been documented in Hutchinson, Skookum, Cavanaugh, Roaring, Howard, and Wanlick Creeks, tributaries to the South Fork Nooksack River.

Warm water temperatures have also been recorded in the lower Middle Fork Nooksack River and in Canyon Lake Creek, but water temperatures are a data need in other Middle Fork Nooksack tributaries. Riparian conditions were rated "poor" along the lower Middle Fork Nooksack River and along Rankin Creek,

but were “fair” to “good” elsewhere. There is naturally limited floodplain habitat in the Middle Fork Nooksack sub-basin.

While the lower North Fork Nooksack River has experienced some warm water temperatures, most of the water quality problems are in the tributaries. Warm water temperatures have been documented in lower Boulder, Gallop, lower Canyon, Cornell, Racehorse, Hedrick, and Kenney Creeks. Many of these areas also have degraded riparian and sedimentation conditions; both contribute to water quality problems. While there are some known floodplain impacts in the North Fork Nooksack sub-basin, quantification was lacking and is a data need.

The Nooksack River sub-basin (downstream of the Forks) has a heavily impacted floodplain and very poor riparian conditions throughout the mainstem and most tributaries. The lack of shade, loss of wetlands, and channel changes are probable causes for the warm water temperatures found in the Nooksack River and the Silver, Tenmile, Bertrand, Fishtrap, Kamm, and Anderson Creek watersheds. Also, compared to other rivers in the Puget Sound region, the Nooksack River near Ferndale has among the highest levels of nitrogen (including ammonia and nitrate), phosphorous, turbidity, and suspended solids. From 1979 to 1991, turbidity has increased between 1 to 2% per year in the lower mainstem Nooksack River.

Inadequate stream flows for salmonid habitat are a pervasive problem throughout WRIA 1, and can contribute to water quality problems. Many of the lowland streams and tributaries flow through land converted to agricultural or urban use, which has resulted in channelization, water withdrawals, a loss of wetlands, and altered land cover. More than thirty drainages and mainstem reaches are closed to further water allocations in WRIA 1, particularly targeting the South Fork Nooksack River and Hutchinson and Skookum Creeks, the North Fork Nooksack River and its major tributaries, and the tributaries to the Nooksack River downstream of the Forks. Land cover vegetation has been greatly altered in all of the Nooksack watersheds downstream of the Forks, as well as in watersheds draining to the lower North, South, and Middle Fork Nooksack Rivers. This can impact both high and low flow conditions.

Major Habitat Problems in the Dakota, California, Terrell, Squalicum, Whatcom, Padden, Chuckanut, Oyster, and Colony Creek Watersheds

The smaller, independent drainages provide habitat for coho, cutthroat, steelhead, chum, and to a lesser degree, chinook. Potentially low stream flows are also believed to be a problem in many of these streams. Dakota, California, Terrell, Squalicum, Whatcom, Padden, and Chuckanut Creeks all have closures for further water allocations, and existing water rights are numerous. The land cover vegetation has also been greatly altered, increasing the likelihood of water flow impacts. Impervious surfaces are rated “poor” in the Terrell and Colony Creeks, and are probably poor in Squalicum, Whatcom and Padden Creeks. Warm water temperatures have been documented in Dakota, Squalicum,

Whatcom, Padden, and Chuckanut Creek watersheds, and have not been measured in California, Terrell, Oyster, and Colony Creeks. Other toxins, such as pentachlorophenol, and mercury, lead, zinc, and copper have been documented in Whatcom Creek with urban and industrial storm water runoff, the suspected source.

Based upon a broad-scale analysis, riparian conditions are tentatively rated "poor" in the watersheds of Dakota, California, Terrell, Squalicum, Whatcom, Padden, Chuckanut, Oyster, and Colony Creeks, but reach-specific data were lacking. Low levels of LWD were noted in Squalicum along with streambed instability. No other data on stability, LWD, pools, or sedimentation were found for any of the above-listed streams. Floodplain conditions are believed to be "poor" in Dakota, California, and Squalicum Creeks due to wetland loss or bank hardening. No other data on floodplain or fish access conditions were found for these streams.

The Lake Whatcom sub-basin supports native cutthroat and kokanee populations. Its tributaries are impacted by landslides in the upper reaches and floodplain degradations such as bank hardening in the lower reaches. Low levels of LWD exist throughout, and streambed stability has ranged from "fair" to "poor". Warm water temperatures and degraded riparian conditions are also common in these tributaries. Increased urbanization and residential development are thought to contribute to water quality problems in Lake Whatcom.

Major Habitat Problems in the Fraser River Tributaries

Habitat conditions in the Washington State portion of the Fraser River tributaries vary greatly with land ownership. The upper Chilliwack, Selesia, Domfino, and Tomyhoi watersheds are relatively pristine, located within either National Park Service or U.S. Forest Service boundaries. In contrast, the Sumas River, Saar Creek, and Frost Creek watersheds have extensive impacts to water quality, flow, and riparian vegetation. Levels of nitrogen (including ammonia) and phosphorous in the Sumas River are among the highest levels in the Puget Sound region, and low dissolved oxygen levels have been documented in several Sumas River tributaries. Numerous surface and ground water rights exist throughout the Sumas River watershed, and the Sumas River and Saar Creek are closed to further water allocations. Little information was found for fish access, floodplain, and sediment conditions in these streams. Chum, coho, and cutthroat are found throughout these streams with bull trout/Dolly Varden in the Chilliwack watershed and chinook salmon in the Sumas River.

Habitat Impacts in the WRIA 1 Estuarine and Nearshore Environments

The condition of the estuarine and nearshore habitat in WRIA 1 varies considerably according to location. Estuary habitat loss has been documented in Bellingham, Lummi, and Samish Bays, but no information was found for other

estuaries in WRIA 1. Overall, Whatcom County ranked 8th out of 14 Puget Sound Counties for the percent of modified shoreline miles. Shoreline modifications (bulkheads, rip-rap, fills) were common along Point Roberts, the Peace Arch, Blaine, Birch Bay, Neptune Beach, Sandy Point Shores, Lummi Bay, Bellingham Bay, and Samish Bay. Most of the areas with high percentages of modified shorelines also had poor overhead riparian vegetation. Overwater structures, which can impact eelgrass beds and directly affect salmonid behavior are a concern in the following areas: Arco Pier, Intalco Pier, British Petroleum Pier, Gooseberry Point Ferry Terminal, Lummi Island Ferry Terminal, inner Bellingham Bay, Point Roberts Marina, Blaine Marina, Birch Bay Marina, Sandy Point Shores Marina, and Squalicum Marina.

Water quality (including sediment contamination) is a major problem in inner Bellingham Bay, where 9 of the 134 total Puget Sound contaminated sediment sites were located. Numerous toxins including mercury, arsenic, and PCBs have been found. Some of these are known to cause tumors and suppress immune systems in salmonids. They can also be lethal to benthic organisms, which serve as food for salmonids, resulting in a potential reduction of prey. Also, the toxins accumulate in benthic organisms, contaminating the food web. The locations and sources of these toxins have been located, and cleanup is in the initial planning and negotiation stages.

Other water quality issues in WRIA 1 include creosote treated materials and oil spills. This summer, the Department of Ecology plans to remove 350 tons of beached creosote-treated wood from the Whatcom County shoreline, but more will likely be deposited in the future.

Conclusion

This report consolidates and rates salmonid habitat conditions from the freshwater to nearshore environments and presents a list of data needs. It is one step in a coordinated effort towards salmonid recovery, providing the technical background that can aid in the development of restoration/protection projects, recovery strategy development, and project ranking. As conditions change over time, it is hoped that new information will be used to modify future versions of this analysis.